

REMARKS

This paper is being provided in response to the Final Office Action dated July 21, 2003, for the above-referenced application. In this response, Applicants have cancelled claims 3, 4 and 7 without prejudice or disclaimer of the subject matter thereof, amended claims 1, 2, 25 and 26 and added new claims 27 and 28 in order to clarify that which Applicant considers to be the invention. Further, Applicants have amended the specification for purposes of clarification. Applicants respectfully submit that the amendments to the claims are fully supported by the originally-filed application and that the amendments to the specification do not add new subject matter.

Applicants respectfully note that pending claims 25 and 26 were not addressed in the Office Action. These claims have been amended herein, and Applicants respectfully request that these claims be examined and considered.

The objection of the Title and Abstract as not being descriptive is addressed by the amendments contained herein according to the guidelines set forth in the Office Action. Applicants respectfully submit that the Title and Abstract are clearly descriptive and indicative of the invention claimed so as to enable a reader to understand the subject matter to which the invention is directed and thereby provide the reader with the ability to "determine quickly from a cursory inspection the nature and gist of the technical disclosure." (See 37 C.F.R. §1.72). Accordingly, Applicants respectfully request that this objection be reconsidered and withdrawn.

The objection of claims 1, 2, 4-6, 8, 9 and 12-14 for informalities is addressed by amendments contained herein according to the guidelines set forth in the Office Action. Applicants have amended the claims to specify that the reflective layer is formed on a same plane as a *gate* electrode. Accordingly, Applicants respectfully request that this objection be reconsidered and withdrawn.

The rejection of claims 1, 2, 4-6, 8 and 12 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,118,505 to Nagata et al. (hereinafter "Nagata") in view of U.S. Patent No. 5,940,154 to Ukita et al. (hereinafter "Ukita") and further in view of U.S. Patent No. 6,172,728 to Hiraishi (hereinafter "Hiraishi") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Independent claim 1, as amended herein, recites a reflection type liquid crystal display. A pair of substrates are disposed opposite to each other with a liquid crystal layer disposed therebetween. A plurality of switching elements are formed on one surface of at least one of said pair of substrates. A reflective layer is constituted of a same material as a material constituting an electrode of said plurality of switching elements and is simultaneously formed during formation of the electrode of the plurality of switching elements on a same plane as a plane of the electrode. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to at least one electrode included in at least one of the plurality of switching elements. Further, a color filter layer is disposed between said reflective layer and said transparent pixel electrode. Claims 2, 5, 6, 8, 9 and 12-14 depend directly or indirectly on independent claim 1. Claim 4 has been cancelled herein.

Independent claim 25, as amended herein, recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching elements formed on one surface of the substrates. A reflective layer is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. A color filter layer is disposed between said reflective layer and said transparent pixel electrode. The switching element is a thin film transistor, and the reflective layer is formed of the same material as the gate electrode of said thin film transistor and on the same plane as the gate electrode. There is a rough portion formed below the reflective layer, and covers the rough portion.

Independent claim 26, as amended herein, recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching elements formed on one surface of the substrates. A reflective layer is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. A color filter layer is disposed between said reflective layer and said transparent pixel electrode. The thin film transistor has a gate electrode electrically connected to a scanning line, a gate insulation film formed to cover the gate electrode, a semiconductor layer formed on the gate insulation film, a drain electrode electrically connected to a signal line, and a source electrode electrically connected to the transparent pixel electrode. The reflective layer is electrically separated from the gate electrode and is formed of a same material as the gate

electrode and on a same plane as a plane of the gate electrode. A rough portion is formed below the reflective layer.

The Nagata reference discloses a liquid crystal display device using transparent organic film color layers. The liquid crystal display device includes an active matrix substrate, a counter substrate disposed to face the active matrix substrate, and a liquid crystal layer interposed between the active matrix substrate and the counter substrate. An interlayer insulating film, formed by a transparent organic film color layer, is formed on the active matrix substrate and pixel electrodes are formed on the interlayer insulating film in a matrix. (See Abstract and Fig. 4 of Nagata.)

The Ukita reference discloses a reflection type liquid crystal display device utilizing a staggered type transistor. A reflection plate 2 is disclosed as being located in a layer below the pixel electrode 6, and below the gate 9. (See Fig. 3 of Ukita.)

The Hiraishi reference discloses a reflective LCD including address lines shaped to reduce parasitic capacitance. The Office Action cites Hiraishi as disclosing the formation of a gate electrode out of aluminum and as disclosing convex portions 11a made of the same material as that of the gate lines 2 in order to minimize the nonuniform wavelength characteristics of the reflected light. Hiraishi discloses a reflective electrode layer 4 that is positioned above an interlayer insulating film 8. (See col. 7, line 66 - col. 8, line 25 and Fig. 4 of Hiraishi.)

Applicants' independent claims, as amended herein, all recite at least the features of a reflective layer formed on a same plane as a plane of the gate electrode in a liquid crystal display device that also includes a transparent pixel electrode formed on the reflective layer and *a color filter layer disposed between the reflective layer and the transparent pixel electrode*. Applicant's invention eliminates setting change-over requirements in manufacturing processes between a reflection type liquid crystal display device and a transmission type liquid crystal display device. Further, due to the configuration of the color filter layer as claimed, Applicants have found that the aperture ratio can be raised and a brighter display can be performed. (See, for example, page 14, lines 1 to page 15, lines 27 of the present application).

Applicants respectfully submit that neither Nagata, Ukita nor Hiraishi, whether taken alone or in any combination, teach or suggest at least the above-noted features. Specifically, Nagata does not disclose any material types or locations for a reflective layer and does not disclose a color layer positioned between a reflective layer and a transparent pixel electrode. Further, Ukita discloses a reflection plate 2 positioned below a dielectric film layer 3 (see Fig. 3 of Ukita) but does not anywhere disclose a color filter layer positioned between the reflective layer and a transparent pixel electrode. Finally, Hiraishi also does not disclose a color filter layer positioned between a reflective layer and a transparent pixel electrode.

In view of the above, Applicants respectfully submit that neither Ukita, Nagata, nor Hiraishi, taken alone or in any combination, teach or fairly suggest at least the features of a reflective layer is formed on a same plane as a plane of the gate electrode in a liquid crystal display device that also includes a transparent pixel electrode formed on the reflective layer and

a color filter layer disposed between the reflective layer and the transparent pixel electrode, as is claimed by Applicants. There is no apparent combination of the references that will produce these claimed features. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

The rejection of claims 13 and 14 under 35 U.S.C. 103(a) as being unpatentable over Nagata in view of Ukita and Hiraishi and further in view of U.S. Patent No. 5,610,741 to Kimura (hereinafter "Kimura") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

The features of independent claim 1 are discussed above. Claims 13 and 14 depend thereon.

The Nagata, Ukita and Hiraishi references are discussed above.

The Kimura reference discloses a reflection type liquid crystal display device with bumps on the reflector. The Office Action cites Kimura as disclosing the patterning of an insulation film to form rough portions on a surface of a substrate below a reflective layer.

Applicants respectfully submit that Kimura fails to overcome the above noted deficiencies of Nagata, Ukita and Hiraishi with respect to Applicants' claims. Specifically, Applicants respectfully submit that neither Kimura, Nagata, Ukita nor Hiraishi, taken alone or in any combination, teach or fairly suggest at least the features of a reflective layer is formed on a

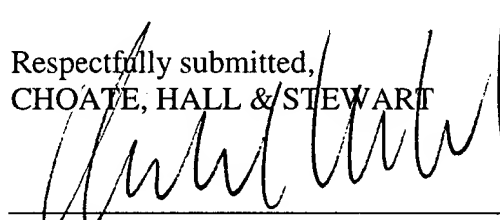
same plane as a plane of the gate electrode in a liquid crystal display device that also includes a transparent pixel electrode formed on the reflective layer and *a color filter layer disposed between the reflective layer and the transparent pixel electrode*, as is claimed by Applicants.

- Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Further, Applicants have added new claims 27 and 28 and respectfully submit, in view of the above remarks, that these claims are patentable over the cited art of record.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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